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ABSTRACT

A study to identify variables between more or less effective student teachers tested student gains in learning a psychomotor skill. The student teachers were observed as they trained students to perform the "handstand roll over" in physical education classes. Observation focused on content of instruction, skill attempt reactions, management of task engagement, affectivity, and monitoring. It was concluded that time on task reinforces motor learning and depends largely on the teacher's choice of activities. Teachers' interventions and a high rate of success raised the time on task. Teacher effectiveness in producing learning gains was dependent upon the ability to transform time allocated for practice into individual student activity. (JD)

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RESEARCH ON TEACHER CHANGE : EFFECTIVENESS OF TEACHING A PSYCHOMOTOR TASK STUDY IN A MICRO-TEACHING SETTING

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In recent years, the importance of teaching effectiveness has been stressed frequently. The question "What does make a difference between more and less effective teachers ?" is commonly asked. Variables identified in answering this question could provide us with valuable informations to improve teacher training or in-service training. These variables are related as well with teaching skills acquisition as with behavior change.

I do not intend to theorize on teacher effectiveness but to describe a study seeking to identify variables differing between more and less effective teachers as far as student learning gains are concerned.

A primary objective was proposed to ten teachers to help the student make the greatest learning gain in a psychomotor skill : the "handstand roll over". Teachers were completely free to organize their teaching, choice of activities, teaching strategies, management of the class, as they wanted.

Teaching was performed by ten student teachers in their last year of professional teacher training. Pupils were 40 physical education students (freshmen) assigned randomly in ten micro-classes.

Two teaching sessions, lasting nine minutes each were organized under the same learning conditions : equipment & materials.

Each student performed two successive trials of the "handstand roll over" immediately before and after the teaching periods (pre-test/post-test). Both trials were videotaped. The students score was determined on the basis of errors in performance. Rating was done by a gymnastic expert not involved in the experience (intra-observer reliability, 94 %).

Classes were distributed in more effective (n = 4) and less effective (n = 4) according to students residualized gains (Soar, 1978).

All the teaching sessions were videotaped with a wide angle in such a way that all the teaching area and all the actors were visible on the screen. A written transcript of all teachers and students verbal behaviors was completed along with a time analysis of the teaching performance.

The OBEL/ULg student observation system was applied. Procedures and rules of application of this system are fully described by M. Piéron & A. Dohogne (1980).

The following student behaviors were timed and associated with teachers'behaviors : (1) motor activity ; (2) demonstration ; (3) spotting ; (4) dealing with equipment ; (5) locating or relocating ; (6) receiving information ; (7) waiting ; (8) off-task behaviors ; (9) verbal interactions ; (10) affectivity.

Teachers'behaviors were categorized as follows : (1) content or instruction ; (2) skill attempt reactions ; (3) management ; (4) affectivity ; (5) monitoring students'activity ; (6) other behaviors.

Main findings.

a) Evaluation of student learning.

Mann-Whitney U Test scores indicated that the two groups did not differ in the pre-test results (Mean score : most effective group 11.1 / less effective group 10.8, U = 7, P = .443). The post-test results differed significantly (Mean score: most effective group 14.0, less effective group 11.6, U = 1, P = .014).

The pre- and post-test raw scores of most effective and less effective groups were compared by the Wilcoxon matched paired test. Learning gains were significant in most effective group ($T = 22$, $P = .05$), non significant in less effective group ($T = 39$).

b) Allotment of class time.

There were no significant differences between the groups in allotment of class time. Nevertheless, more effective learning groups spent more time in receiving information from the teacher. Time spent in transition was approximately the same.

In classroom research, N. Bennett (1978) & B. Rosenshine (1978) pointed out that more effective classes were well organized. It seemed that organization can characterize more or less effective teachers.

Allocated time for practice was slightly higher in less effective classes.

c) Students'behaviors.

a) Individual activity time (engaged time).

In more effective groups students spent 29.4 % of their time in motor activities, in less effective groupes, 28.0 %. The difference was not significant ($U = 5$, $P = .243$).

The unique concept of engaged time was not able to explain the differences in learning gains, in teacher effectiveness.

Of great interest was the use of allocated time made by individual students. In more effective groups, the ratio between individual engaged time and allocated time for practice amounted to 42.8 %, in less effective groups 38.4 %. The 4.4 % difference between groups was significantly different at a .10 level (U = 3). Although slight, this difference showed a more effective use of time. This better use of time could be enhanced through class management or through teacher's intervention, hustling, encouraging or intervening sooner to prevent inactivity.

M. Piéron (1980) observed similar differences between master teachers and student teachers, indicating that more effective teachers use their allocated time to provide students with greater amount of individual practice time.

b) Criterion related time-on-task.

Part of the engaged time was devoted to practicing the criterion, i.e. the "handstand roll over". Other exercises were designed to improve the handstand, others to correct deficiencies in movement. They were considered as not directly task oriented.

The difference between groups was highly significant (U = 1, P = .014). The most effective group spent 22.1 % of time practicing the criterion task, the less effective group only 7.7 %.

The ratio between criterion time-on-task and allocated criterion time-on-task also favored the more efficient group (32.2 - 26.7 %). This ratio reflects better class management.

c) Frequency of trials.

Three variables intended to reflect the opportunity

to learn criterion were in favor of more effective learning groups : (1) the frequency of criterion trials (514-163) ; (2) frequency of criterion trials related to allocated time for practice (1 trial each 23.1 sec. and 77.4 sec.) ; (3) frequency of criterion trials related to allocated time for criterion practice (1 trial each 15.9 sec. and 22.3 sec.).

The first two variables were activities chosen by the teacher. The third variable was related to class management and teacher behaviors.

d) Information received by students.

Time spent in receiving information by the students did not differ between groups. However, students in classes characterized by higher learning scores received more skill attempt reactions and particularly more specific reactions on skill attempts.

This difference seemed to be in contradiction with Yerg's findings of no relationships between learning gains and opportunity to learn defined as a teacher's intervention (feedback, praise).

CONCLUSIONS.

The commitment to teacher's role in helping students to learn seems to be confirmed in many studies. Several hypotheses concerning teaching efficiency can be developed from data collected in reported studies. These hypotheses are coalesced around two main concepts : (1) time spent on task ; (2) teacher's skill attempt reactions (augmented feedback).

Time-on-task depends largely from the teacher's choice of activities. Activities strongly related to the criterion task to be learned may increase the learning gains. Activities performed at a high rate of success could raise the time-on-task. Teacher's interventions are able to increase that time too.

Teacher effectiveness in producing learning gains was dependent upon the ability to transform time allocated for practice into individual student activity.

Skill attempt reactions (augmented feedback) differed between more and less effective teachers.